

Rural Injury Deaths in Nevada: A Comparison of American Indians and Non-Indians, 1980-1987. David Wallace, Class of 1989.

ABSTRACT

Past studies have shown that American Indians (AI) are at higher risk of injury death than non-American Indians (non-AI). These studies have not considered differences between urban and rural environments. Using mortality data (1980-1987) from the National Center for Health Statistics, adjusted injury death rates for AI and non-AI living in rural Nevada were compared. Rural injury death rates among AI exceeded those among non-AI for motor vehicle (69/100,000 vs 43/100,000), suicide (43 vs 37), and overall injuries (169 vs 135). Rates for both groups were similar for homicide (21 vs 20). This study shows that AI in Nevada are still at greater risk of dying from injuries, even when compared to other rural residents.

Several studies have found AI death rates from unintentional injuries to be approximately twice the rate of the white or black populations.¹⁻³ The most-rural Indian reservations have experienced motor vehicle-related (MVR) mortality 8-12 times higher than the US average.⁴ Previous studies, comparing AI to other populations, have not considered the possible effects of urban and rural environments. In the US, unintentional injury death rates are highest in rural areas. The rate for people living in rural environments is twice the rate for people living in the largest (1,000,000 or more population) cities (75/100,000 vs 37/100,000).³ Most Indian reservations are in rural environments. The high injury mortality of AI/AN may be similar to the injury mortality experienced by rural non-Indians (non-AI). Since living in a rural environment is certainly a risk factor for injury mortality, rates should be compared in rural populations.

The majority of the state of Nevada is considered rural, with most counties having low population densities. In 1983, 79.2% (716,580) of Nevada's population lived in the areas of Reno-Sparks and Carson City and Las Vegas. Most of the AI population in Nevada live on rural reservations, permitting comparison of injury deaths among rural AI and non-AI. This research considered two main questions: (1) Are high injury mortality rates for AI associated with rurality? (2) How do these high rates compare to other rural Americans?

Background

Several studies have found higher injury death rates for rural people. "Rural" was defined as population centers with 2,500-50,000 people.^{5,6} Motor vehicle-related (MVR) deaths are the leading cause of rural injury mortality. The rural MVR death rate is over twice the rate in the largest cities (37/100,000 vs. 14/100,000).³ Some researchers attribute higher rural MVR death rates to differences in exposures: they drive more miles at higher speeds. Based on vehicle miles traveled, rural areas still had higher death rates.⁷ In a study of pedestrian deaths in Washington, those in a rural collision were more than twice as likely to die than those in an urban collision.⁶

Reduced access to trauma centers and greater distances to emergency facilities may contribute to these higher rural death rates. In the MVR pedestrian study in Washington, death certificate data indicated that 68% of rural patients received in-field emergency care compared to 75% of urban patients. In spite of the availability of emergency medical services (EMS), 48% of rural fatalities died before reaching the hospital compared to 32% of urban fatalities. The study also found that 57% of the rural fatalities occurred at the scene or during the first hour after injury, compared to 39% of the urban fatalities.⁶

Poorer road conditions may also play a role in higher rural death rates. The absence of adequate road shoulders, lighting, striping, signs, guardrails, and a large proportion of two lane highways all contribute to the likelihood and severity of crashes.⁷ Road conditions may explain some of the high MVR death rates among AI, because many of the rural western reservations have unpaved and unimproved roads. Non-motor vehicle injury rates including drowning, house fires, airplane crashes, unintentional firearms, and machinery are also higher in rural areas.³ Nevada counties have some of the highest injury death rate percentiles for all unintentional, firearm homicide, and MVR injuries when compared to all U. S. counties.⁸ In comparing states, Nevada currently has the highest rate of suicide in the United States.

Methods

Information about injury deaths for rural Nevada residents from the years 1980-1987 was obtained from the National Center for Health Statistics (NCHS) mortality data tapes. Injury deaths are coded using the Ninth International Classification of Diseases (ICD9) supplementary classification of external causes of injury and poisoning (E-codes). All unintentional injuries (E800-949), suicides (E950-959), homicides (E960-969), and undetermined (980-988) were selected. Misadventures of surgical and medical procedures (E870-879), and adverse effects from drugs (E930-949) were not included. MVR "Crashes" are restricted to traffic categories (E-810-819). MVR non-traffic (E-820-825) deaths were included in the "other" category.

Mortality records were selected by county of residence and county of occurrence. To meet the case definition, the injured person had to be a rural Nevada county resident, and the death had to occur in a rural Nevada county. Rural Nevada was considered to be the entire state of Nevada, excluding the counties of Clark (Las Vegas), Carson City, and the Reno-Sparks urban area of Washoe county. In 1983 the largest city in the study area was Elko (population 10,590). The median population for incorporated cities in the study area was 2,090. County populations ranged from 59,650 (the rural portion of Washoe), to 1,270 (Eureka).

AI/non-AI status was identified from the NCHS mortality data. All deaths not coded AI were grouped as "non-Indian." Population denominators were derived from U.S. Census estimates from the State of Nevada, Section of Vital Statistics (non-AI), and the Indian Health Service (AI) for the median study years (1983, 1984). Only rural counties were included. Age-adjusted rates were calculated by the direct method and standardized to the rural Nevada (AI and non-AI) population in the median years (1983, 1984). Rates are expressed per 100,000 person years.

Results

During the 8 year time period (1980-1987), 92 AI and 1676 non-AI rural Nevada residents died as a result of injury. MVR traffic events were the leading cause of injury death for both AI and non-AI. Suicides were second, and homicides were third for cause of injury death. For all injuries, the age-adjusted death rate for AI was 169, and 135 for non-AI, with a standard mortality ratio (SMR) of 1.25. The age-adjusted rate for AI males was 236, and 196 for non-AI males (SMR= 1.2). The rates for females were substantially lower, 99 for AI, and 69 for non-AI, but the ratio of female AI deaths to non-AI were significantly higher--SMR of 1.42 (see all injury chart). AI were more likely to die from MVR events, suicide, and homicide, but had relatively few deaths occurring outside of these three categories.

Table I. Frequency of Injury Death in Rural Nevada By Type of Event, 1980-1987

| <u>Injury Cause</u> | <u>American Indian</u> | <u>Non-Indian</u> |
|-----------------------|------------------------|-------------------|
| Motor Vehicle Traffic | 39 (42.39%) | 518 (30.9%) |
| Suicide | 27 (29.34%) | 457 (27.26%) |
| Homicide | 10 (10.86%) | 248 (14.79%) |
| Fire | 3 (3.26%) | 53 (3.16%) |
| Drowning | 0 | 65 (3.87%) |
| Falls | 1 (1.0%) | 71 (4.23%) |
| All Other | 12 (13.0%) | 264 (15.75%) |
| TOTAL | 92 | 1,676 |

Motor Vehicle Traffic: Age-adjusted death rates due to MVR Traffic crashes were 69 for AI, and 43 for non-AI. The highest rates were found in AI and non-AI males. In comparing AI to non-AI, the SMR was 1.61 for both males and females. Age specific death rates for AI males were highest for persons 15-24 years of age (110), with peaks at 35-44 years of age (178), and in those persons over 65 (233). Non-AI male rates for persons 15-24 years of age (91) were similar to AI, but gradually declined with age to about half of the AI rates after age 35. Female age specific rates for AI and non-AI peaked at 15-24 years of age (99 and 36 respectively), with AI female rates being higher than non-AI males.

Loss of control/single vehicle crashes were the most frequent cause (59%) of MVR deaths for AI. MVR collision was the most frequent cause in non-AI deaths, followed closely by loss of control crashes. Pedestrian, non-collision, and unspecified events were distributed similarly for both AI and non-AI.

Suicide: Overall age-adjusted suicide rates were 43 for AI, and 37 for non-AI (SMR= 1.16). Males accounted for 92.5% (25) of the AI suicides, and 78.1% (354) of the non-AI suicides. Non-AI females committed suicide at almost 3 times the rate of AI females (see suicide charts). The age-adjusted rates for males were 77 for AI and 57 for non-AI (SMR=1.35). Age specific rates for AI males exceeded those for non-AI by over 2 1/2 times in the persons aged 15-24. Non-AI male rates peaked in persons over 65 years of age--73/100,000.

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Table II. Frequency of Suicide in Rural Nevada By Method, 1980-1987

| <u>Method</u> | <u>American Indian</u> | <u>Non-Indian</u> |
|---------------|------------------------|-------------------|
| Firearms | 22 (81.4%) | 334 (73.7%) |
| Hanging | 3 (11.1) | 32 (7.0) |
| Drugs | 1 (3.7) | 45 (9.9) |
| Gas Poisoning | 1 (3.7) | 31 (6.8) |
| Other | 0 | 11 (2.4) |
| TOTAL | 27 | 453 |

Homicide: Age-adjusted homicide rates for AI and non-AI were very similar-21 and 20 respectively. The rates were very different, however, when compared by race and sex. Homicide rates were highest among non-AI males (29), and AI females (25) (see homicide charts). The rate for AI males was 18, and was 11 for non-AI females. In comparing AI to non-AI, the SMR for males was 0.61, with the SMR for females being 2.23. AI females died as a result of homicide at over twice the rate of non-AI females.

Intentionality: The distribution of injury deaths by intent for AI and non-AI were very similar (Table III).

Table III. Distribution of Injury Deaths by Intent, 1980-1987

| <u>Intent</u> | <u>American Indian</u> | <u>Non-Indian</u> |
|---------------|------------------------|-------------------|
| Unintentional | 57.6% | 55.7% |
| Intentional | 40.2 | 42.1 |
| Unknown | 2.2 | 2.3 |

Discussion

Among rural Nevadans over an 8-year period, age-adjusted injury mortality rates for AI exceeded non-AI rates by a ratio of 1.26 to 1. For unintentional injury, AI had a higher risk of death, exceeding non-AI rates by a ratio of 1.42 to 1 (unadjusted rates). The magnitude of the difference in fatal injury rates in AI and non-AI in this study is much less than that in previous studies. This suggests that factors of living in a rural environment may account for a large part of that difference. Previous studies have shown that for many types of injuries, people in rural areas have higher mortality rates than urban populations. As most AI live in rural areas, their injury mortality rates will be much higher when compared to rates from urban areas.

MVR deaths account for much of the difference in injury fatalities between AI and non-AI in rural Nevada. The percentage of AI who were killed in MVR crashes exceeded non-AI by about 11%. It is well-known that young males are at very high risk of MVR mortality. Young AI females were also at very high risk, and were killed in MVR crashes at a higher rate than non-AI males in the 15-24 year age group. The rates for AI females 35-44 were also high--about 3 times the non-AI female rate. Male MVR rates were quite similar up to ages 25-34, then AI exceeded non-AI--often two times or more.

Nationally, alcohol is involved in about 50% of all fatal MVR crashes, and 60% of fatal single vehicle (loss of control) crashes.^{10,11} In New Mexico, alcohol is involved in 55 to 65% of MVR fatalities. In the high risk 15-24 year old age group, the mortality rate attributable to alcohol was 50 times greater in AI than non-Hispanic whites. According to the National Institute on Alcohol Abuse and Alcoholism, Nevada ranks first, with New Mexico second, in the rate of alcohol-related mortality. Rural AI in Nevada experience a greater proportion of MVR single vehicle, loss of control crashes than non-AI. These types of crashes are easily influenced by alcohol involvement. Although roadway conditions may be a factor in the higher MVC rates of AI, many State highways in Nevada run through Indian reservations and are used by both AI and non-AI. Much of the isolated rural Nevada roadways are similar. Seat belt usage rates are lower in rural areas, and may be lower in AI than non-AI. None of the reservations in Nevada have seat belt ordinances.

Fatal and non-fatal motor vehicle crash (MVC) rates influence how state and federal safety and maintenance funds are allocated. Tribal Police Departments and BIA police in Nevada generally do not report non-fatal MVC's to the State. A study of crashes on Paiute Indian Reservation found that 30% had been investigated by BIA police.¹² These crash reports had not been forwarded to the Nevada Department of Transportation (NDOT). This makes it appear that state highways running through Indian reservations have lower crash rates than other state highways. This is not in the best interest of the Nevada Tribes, as consideration for roadway improvements are based partially on crash rates.

Availability of EMS care and access to trauma centers are likely a factor in high rates of MVR mortality in rural Nevada. Trauma centers are located in Reno and Las Vegas. Most of the state is hours away by ambulance;

emergency transport of serious injuries relies on airplanes and helicopters. Several of the remote Indian reservations rely on volunteer "first responder" and EMS groups to provide emergency care before more skilled care is available. This, too, may be a factor needing further study.

Suicide rates for rural Nevada and the entire state are higher than any other state. By method, firearm use is high in rural Nevada, with over 80% of AI and 73% of non-AI suicides using firearms. The AI female suicide rate was very low (6) in comparison to the non-AI female rate (16). This rate, however, might not be stable since it is based on only 2 deaths. Nevada has unique characteristics in its legalized gambling, prostitution, and gold-mining industries. These occupations often have a high turnover rate for employees and can sometimes be a "boom and bust" life-style, which might be associated with social problems. For AI males, isolation, high unemployment, and alcohol involvement are too often a part of reservation life; we need further research to determine the relationship of these factors in AI suicide.

Homicide rates for AI females were very high, exceeded only by non-AI males. This is very different from national figures, and indicates a possible high rate of lethal spouse/partner abuse. These high rates are the opposite of non-AI females, who had the lowest homicide rates by comparison. Firearms were used in the majority of rural Nevada homicides.

Summary and Conclusions:

Rural injury death rates among AI exceeded those among non-AI for all injuries, motor vehicle traffic injuries, and suicides. Rates for both groups were similar for homicide. Compared to rural non-AI, rural AI in Nevada are at increased risk of death especially from:

1. MVR traffic injury: ratio of 1.6 to 1
2. Female homicide: ratio of 2.2 to 1
3. Overall female injury: ratio of 1.4 to 1

While the rates for AI exceed those for non-AI, the difference is not as large as previous studies which compared AI rates to U.S. or state non-AI rates. In Nevada, it appears that risk factors in a rural environment contribute to injury mortality, regardless of whether AI or non-AI.

Possible injury interventions for AI in Nevada would be:

1. Target MVR injury: Pass tribal seat-belt ordinances associated with education and enforcement efforts. Conduct motor vehicle crash studies on reservations to better determine how crashes occur, extent of seat belt use, and if any clustering is occurring. Work with highway agencies responsible for road conditions to correct any hazards.
2. Initiate a severe injury surveillance system to provide information on suicide attempts and assaults. Appropriate social services and law enforcement agencies can then intervene.
3. Establish a network to target young males (15 to 34) who are at high risk for suicide.
4. Gather more information on female homicides; establish a network to intervene in assaults to females.

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